



Traverse City Central Senior High SCI-MA-TECH Program and the Convergence Education Foundation in conjunction with The Great Lakes Water Studies Institute and the Thunder Bay National Marine Sanctuary proudly present a unique teacher workshop opportunity:



2nd Underwater Remotely Operated Vehicle (ROV) Building for the Classroom – December 5-6, 2008

- ★ Learn how to build your own underwater ROV
- ★ Learn how to incorporate ROV's into your classroom curriculum
- ★ Leave the workshop with one fully functioning ROV and support materials!

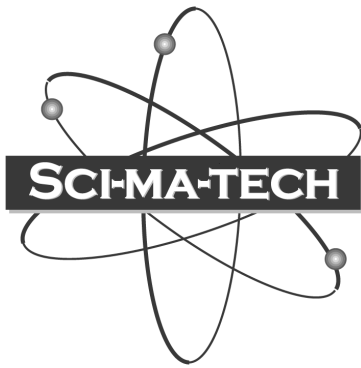
Workshop Overview

This workshop will provide a truly unique educational outreach opportunity that includes the resources, instruction and support, for the designing, engineering, and building of a fully functional underwater remotely operated vehicle (ROV). Within the confines of the workshop participants will be exposed to the different engineering challenges faced in the submarine environment. In addition participants will be presented with concepts in science, mathematics and technology that will facilitate building a ROV with students. It is expected that participants will then use the acquired resource and replicate this activity with students within their own school or classroom. The pedagogy is “constructive” and based on the best practices in science as outlined in the National Resource Council’s Guide, *How People Learn* and *12 Brain/Mind Principles in Action* (Corwin Press 2004). In addition skills and activities presented in this workshop support the *Michigan Merit Curriculum* in science, mathematics and technology.

During the ROV workshop participants will:

- Build a fully functional small scale ROV that can be replicated with students
- Gain a better understanding of the unique engineering challenges presented by the submarine environment
- Learn methods of propulsion and control in 3 dimensional space
- Be exposed to optics and optical systems that must function in a denser medium and at very low light levels
- Resolve issues of buoyancy and weight
- Assemble a control tether and power distribution box using a 12V source
- Test the ROV by performing certain pre-determined tasks underwater
- Acquire the knowledge, skills, and resources to effectively mentor students in designing and building an ROV at their own school
- Make connections with educators with similar interests and share “best practices” in teaching and instruction.
- Learn how to use the completed ROV to support other academic offerings (marine biology, archeology, etc.)
- Gain exposure to the different opportunities presented by other related groups such as the Great Lakes Water Studies Institute, the Convergence Education Foundation, and the Thunder Bay Marine Sanctuary

Currently little or no opportunity exists for engineering or applied science projects in the marine environment, especially at the high school level. Other robotics projects all tend to be terrestrial in their application. The marine ROV building challenge truly offers some unique engineering challenges and design parameters that are not addressed in other robotics projects. It is hoped that you will take this invitation to apply for this truly unique opportunity to put science, mathematics, engineering and technology into practice.



2008 ROV Workshop Details



Primary Sponsor: Convergence Education Foundation (www.cef-trek.org)

Lead Contact: Keith Forton, SCI-MA-TECH, Traverse City Central Senior High

Additional Support:

- Great Lakes Water Studies Institute at Northwestern Michigan College
- Thunder Bay National Marine Sanctuary
- Civic Center Pool, Grand Traverse County
- Holiday Inn West Bay, Traverse City, Michigan

Co-Presenters:

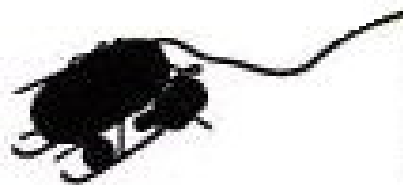
- Karl Klimek, Barb Land - Convergence Education Foundation
- Hans Van Sumeren – Great Lakes Water Studies Institute at Northwestern Michigan College
- Cathy Green - Thunder Bay National Marine Sanctuary
- John Failor, Hal Lalonde, Than Dykstra, Michael George and students of SCI-MA-TECH ROV engineering team, Traverse City Central Senior High

Date: Friday December 5th, 5:30-9pm, and Saturday December 6th, 9 am-5pm

Location: Room 112 and 114 at the Great Lakes Campus of Northwestern Michigan College, Traverse City, Michigan.

Target Participants: K-12 Educators in science, engineering, technology, and mathematics or any other discipline that has interest in aquatic environments (i.e. aquatic biology, marine archeology, etc.) A maximum number of 8 teams, with each team made up of 3 educators from the same K-12 institution or ISD (24 total participants) and will be selected to participate in the workshop, based on:

- Team and group dynamics
- A future vision and willingness to implement ROV technology into the classroom
- Professional background, teaching experience and philosophy
- Leadership experience
- A letter of support from their respective school principal committing \$150 toward the cost of materials used in the workshop (\$50 per participant)
- Willing to share with the group what they have accomplished as a result of the workshop
- First preference will be given to schools in the Great Lakes region that have not previously participated in a CEF-ROV workshop



Requirements and Expectations of Participants: Teachers who would like to participate in the workshop will be required to:

- Be a current faculty member of a K-12 educational institution
- Submit an application form for review and possible selection
- Demonstrate a willingness to return to their respective institution and integrate ROV technology into the curriculum either directly or indirectly (i.e. engineering club)
- Form a team of 3 teachers from the same K-12 educational institution or ISD and participate as a team for the entire workshop from 5:30 pm Friday December 5th through 5 pm Saturday December 6th
- Pay their own travel, meals and hotel (discounted rates from adjacent hotels pending)
- Provide a letter of support from their principal or immediate supervisor committing \$150 toward the cost of materials, payable to the Convergence Education Foundation
- Be willing to share what they have accomplished as a result of the workshop. This could be adapting lessons, unique engineering innovations or innovative uses of the ROV.
- Acknowledge that all materials received in this workshop will become property of their respective school(s)

Lodging and Meals: If accepted, participants will be offered a discount (pending) on lodging at the Holiday Inn West Bay, which is immediately adjacent to the Great Lakes Water Studies Institute. A working lunch will be provided Saturday afternoon with light snacks during the day.

Cost Share: Principals of participant teams will be required to commit \$150/team (\$50/person) to help support the cost of material used during the workshop. Once completed each team will take back a fully functional ROV, control box, power source and optical system back to their respective school. Workshop fees will be **non-refundable** and proceeds will be payable to the Convergence Education Foundation.

Reach and Longevity: As a result of this workshop, 24 teachers will be empowered with the skills and materials needed to excite and engage students at their respective schools. Previous experience has shown building an ROV can sustain approximately 30-students/year/school. In addition over 75% of the materials (camera, motors, etc.) used in the workshop can be recycled for use in future years.

Summary: The ROV engineering project has been a unique and viable platform from which to teach applied science and engineering concepts. It is hoped that participants in this will bring back to their schools the knowledge and skills to actively engage students in a project that will facilitate learning and expose students to new career fields.

Further Information: For additional information please contact Keith Forton, Traverse City Central Senior High at 231-933-8536 or fortonke@csh.tcaps.net . Please put **ROV** in the subject line as to avoid accidental deletion.

